itle: Rolling Software Upgrades for Fault Tolerant Systems

Inventor: Vedvyas Shanbhogue Client/Matter: 2207/13056 Serial No.: To be Assigned

Kenyon & Kenyon

1500 K Street, N.W., Suite 700 Washington, D.C. 20005-1257

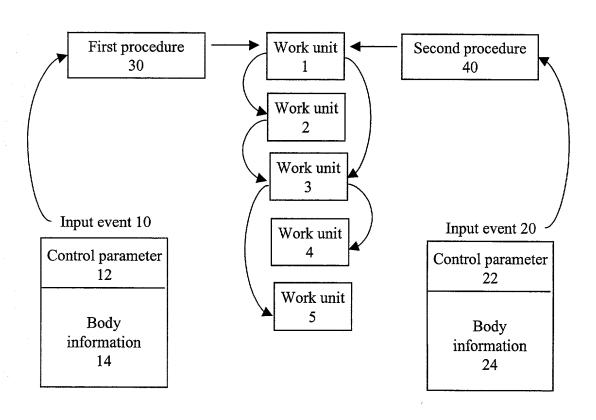


Fig. 1

Hille. Rolling Software Upgrades for Fault Tolerant Systems Kenyon & Kenyon 1500 K Street, N.W., Suite 700 Washington, D.C. 20005-1257 Inventor: Vedvyas Shanbhogue

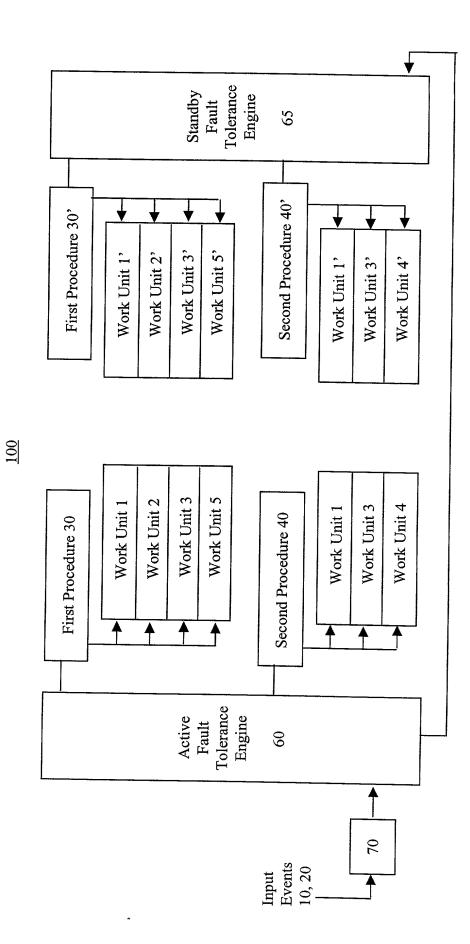


Fig. 2

Title: Rolling Software Upgrades for Fault Tolerant Systems Inventor: Veryals Software Upgrades for Fault Tolerant Systems Inventor: Veryals Software Client/Matter: 2207/13056

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Kenyon & Kenyon 1500 K Street, N.W., Suite 700 Washington, D.C. 20005-1257

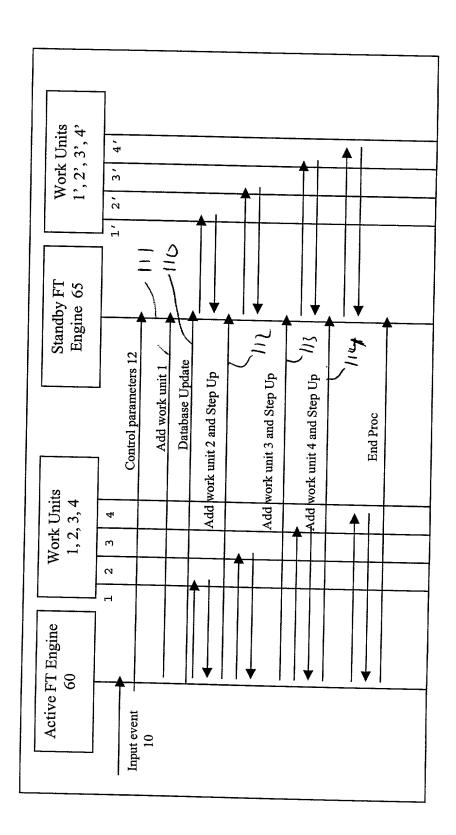
3 of 6

Work Units 1', 2', 3', 4', 5' 5; 4 3 Ű 91 93 95 67 Standby FT engine 92 94 96 88 Control parameters 12 End procedure 64 Step up 61 Step up 62 Step up 63 5 Work Units 1, 2, 3, 4, 5 4 3 81 83 85 87 Active FT engine 82 2 86 88 9 Input event 10

Fig. 3

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1500 K Street, N.W., Suite 700 Washington, D.C. 20005-1257

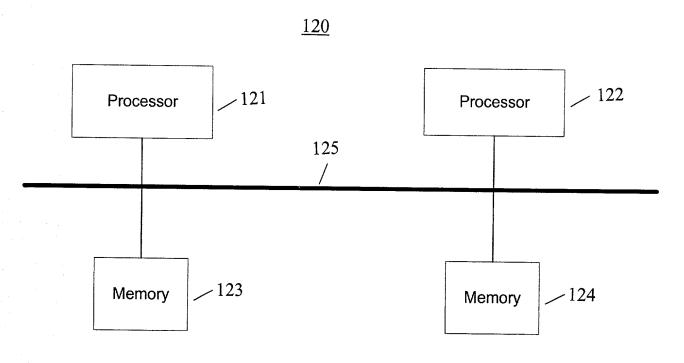


Fig. 5

Title: Rolling Software Upgrades for Fault Tolerant Systems Inventor: Vedvyas Shanbhogue Client/Matter: 2207/13056 Serial No.: To be Assigned Kenyon & Kenyon 1500 K Street, N.W., Suite 700 Washington, D.C. 20005-1257 6 of 6 Initial State: -Processor 121 is active, Processor 122 is backup 200 -Each execute software version 1.0 -P121 generates run time state updates 201 Isolate Processor 122 by taking out of service 202 203 204

Reload Processor 122 w/ version 2.0. Disable new version 2.0 features Make Processor 122 standby for Processor 121 Processor 121 generates updates to Processor 122 Make Processor 122 active to evaluate version 2.0 If not successful, Processor 121 is active and Processor 122 falls back to version 1.0 Return to step 200 if failed If successful, isolate Processor 121 by taking out of service Continue to step 205 Reload Processor 121 with version 2.0 205 Disable new features 206 Make Processor 121 standby for Processor 122 Disable new features All processors upgraded 207 Enable new features of version 2.0 Rolling upgrade completed

Fig. 6